## REMARKS

Entry of the foregoing and reexamination and reconsideration of the subject application, as amended, pursuant to and consistent with 37 C.F.R. § 112, are respectfully requested in light of the following remarks.

Upon entry of the foregoing amendments, Claims 10-36 will remain in this application.

Claims 10 and 17 have been amended to replace "consisting of" with "comprising", to recite in a first container at least one blocked isocyanate, to delete the phrase "a second component comprising" from the second container; and to define the at least one blocked isocyanate. Support for this amendment is found in the specification at least on page 3, lines 30 - 38, page 5, lines 19-26, page 6, lines 1-13 and page 12, lines 27-33. Claims 11, 22 and 30 have been amended to recite that $R^2$ is selected from the group consisting of a linear or branched $C_1$-$C_{10}$ aliphatic or cycloaliphatic group. Support for this is found in the specification at least on page 5, lines 22-26. Claims 12, 23 and 31 have been amended to recite that at least one of $R^2$, $R^4$ and $R^5$ is a linear or branched $C_2$-$C_5$ aliphatic or cycloaliphatic group. Support for this is found in the specification at least on page 5, lines 22-26. Claims 13, 24 and 32 have been amended to clarify the claim by reciting that $R^2$ is selected from the group consisting of a linear or branched $C_2$-$C_5$ aliphatic or cycloaliphatic group. Support for this is found in the previous version of the claim. Claims 14, 16, 25, 33 and 35 have been amended to have antecedent basis in the claim from which they depend. Claims 19, 21,

28, 29 and 36 have been amended to recite in a first container at least one blocked isocyanate, to delete the phrase "a second component comprising" from the second container; and to define the at least one blocked isocyanate. Support for this amendment is found in the specification at least on page 3, lines 30 - 38, page 5, lines 19-26, page 6, lines 1-13 and page 12, lines 27-33. Claim 19 has also been amended to clarify step c) by reciting spreading a coat of said mixture of the two-component polyurethane. Claims 27 has been amended to delete "method" and replace it with "composition" to have proper antecedent basis from claim 10, from which it depends.

No new matter has been added in making these amendments.

**35 U.S.C. §112 first paragraph Rejections**

Applicants gratefully acknowledge the withdrawal of the previous rejections of claims 10-28 under 35 U.S.C. §112 first paragraph.

**35 U.S.C. §112 second paragraph Rejections**

Claims 19, 27 and 30 have been rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention.

a. The Office Action indicates that it is not clear if the "two-component polyurethane" in c) is the same or different as the "two-component polyurethane of line 2.

Claim 19 has been amended to clarify that the "two-component polyurethane" in c) is the same as the "two-component polyurethane of line 2.

b. The Office Action indicates that Claim 27 does not make sense in that claim 10 is a composition claim.

Claim 27 has been amended to recite: "The composition as claimed in claim 10,".

c. The Office Action indicates that for claim 30, the word "method" should not be underlined.

Claim 30 has been amended to delete the underlined word "method" and to replace it with the non-underlined word "method".

Claims 19, 27 and 30 particularly point out and distinctly claim the subject matter which the applicant regards as the invention. Applicants therefore request withdrawal of these rejections under 35 U.S.C. §112, second paragraph.

**35 U.S.C. §103(a) Obviousness Rejections**

Applicants note that the claims are directed to a two-component polyurethane composition. "Two-component" polyurethane composition (systems) are a term of art used in the paint and coating industries. As recited in the Polyurethane Handbook, Chapter 10 - PU Paints and Coatings; Section 10.1 - Paints and Coatings:

Due to the abundance of products and product types which were developed and are included under the heading of "polyurethane paints" today, a systematic classification of the major product groups is appropriate.

1. Two-component systems in which the binder is comprised of a polyol and a polyisocyanate.
2. One-component systems in which the binder is a polyisocyanate that dries and hardens by reaction with atmospheric moisture (moisture curing).
3. One-component systems in which the binder contains a polyol and a blocked polyisocyanate. The film forming reaction occurs by the reaction of a polyol with the polyisocyanate which has been generated by heating and subsequent "splitting-off" of the blocking agent.

A copy of the this section of the Polyurethane Handbook is enclosed as Attachment A.

One of ordinary skill in the art would recognize that "two-component systems" are a term widely recognized in the art and that such "two-component systems" are distinct from a composition having two components that exist separately before being mixed. The specification refers to one ("1K") and two ("2K") component systems one page 1, line 34 to page 2, line 8 of the specification, where "1K" and "2K" are terms used to described 1- or 2-component systems. U.S. Patent 6,013,326, cited by the Examiner, also shows that one component (one-pack) and two component (two-pack) systems were widely used terms having special meaning in the art. (See col. 4, lines 26-32 of the '326 patent provided below).

> The coating compositions according to the invention contain one or more free or blocked polyisocyanates as component D). If blocked polyisocyanates are present, the coating compositions according to the invention are one-component (one-pack) coating compositions. If free polyisocyanates are present, they are formulated as two-component (two-pack) systems.

In addition, a search on the internet for " one component polyurethane coatings", "two component polyurethane coatings", "1K polyurethane coatings"; and "2K polyurethane coatings" each returned over 100,000 results and identified numerous commercial sources of polyurethane coatings based on such designations. In addition, a search on the internet for "2k paint" returned 1,230,000 results including numerous related searches such as "2 pack epoxy paint", "1K 2K paint", "2k paint suppliers", "mix 2k paint", and "2k epoxy primer". Thus it clear that a "two component composition" is a term of art referring to a specific type of coating composition. Applicants respectfully submit that two component compositions are distinct from having two components that exist separately before being mixed and that one of ordinary skill in the art would recognize these distinctions.

1. Claims 10-36 have been rejected under 35 U.S.C. §103(a) as unpatentable over JP 62-164049.

Applicants respectfully submit that these claims are not obvious over JP 62-164049 and that indeed all of the claims as amended are allowable.

To establish a *prima facie* case of obviousness, three basic criteria must be met. (MPEP 2143) First, there must be some suggestion or motivation, either in the

references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The '049 patent discloses a planographic printing plate in which a recording layer is produced using a composition comprising a polymer having an active hydrogen that can react with a block isocyanate, an isocyanate and a photothermal substance.

The Office Action states:

> Page 7 of the translation clearly teaches that a polyol may be used as the polymer that reacts with the blocked isocyanate. (page 4, line 4-6)
>
> However, page 7, lines 9-20 merely teaches that:
>
> "along with the block isocyanate ... a polymer having an active hydrogen that can be cured by reacting with isocyanate being generated from the block isocyanate when heating is used. The isocyanate reacts with many functional groups, and ... a polymer having at least one kind of functional group being selected from a hydroxyl group ... is preferably used. As the polymer containing a hydroxyl group a polyol prepolymer for a polyurethane resin such as polyether polyol, polyester polyol, acryl polyol, and epoxy polyol is mentioned.

The '049 patent merely teaches that the isocyanate can react with a polyol. The '049 patent teaches:

> The recording layer is mixed with a dispersed solution or solution of a block isocyanate, a polymer solution containing an active hydrogen, ... " (page 10, lines 3-5)

Such a disclosure doe not describe a two-component system, as required by the claims of the current application. The '049 patent does not disclose or provide any

teachings regarding a two-component system, which is required by the claims of the current application.

To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. There is no suggestion or motivation in the '049 patent to obtain a two component composition as required in the claims of the instant application. The previous Office Action alleged in Response to Arguments (page 6) that the two components exist separately before being mixed, and therefore the compositions are two component compositions. As shown above, one of ordinary skill in the art would recognize that a two-component system is a term of art for a specific type of composition and is distinct from a composition having two components that are mixed together. Applicants had indicated in the response to the previous Office Action that under the definition of a two-component system, as used in the Office Action, Example 1 is a three component system and Example 2 is a five component system. The Office Action alleges that the other ingredients of these Examples are not required, and are merely exemplary of the process. (page 4, lines 6-8). Applicants respectfully submit that at least one of the other ingredients are required for the invention described by the '049 patent to be operable. Examples 1 and 2 each comprise an ethanol dispersed solution of carbon black. (page 13, lines 16-17 and page 14, lines 20-21) The '049 patent requires the recording layer to contain an agent for light-to-heat conversion.

(Abstract, page 3 - lines 7-10, page 4, line 20 - page 5, line 3 and page 8, second paragraph) The '049 patent teaches:

> The photochemical converting substance being used in the present invention absorbs a high-energy light and converts the optical light into a heat, and various kinds of coloring pigments and dyes are used. As its detailed examples, carbon black, ... (page 8, second paragraph)

The '049 patent further teaches that after irradiation with light:

> the unheated part, that is, the recording part pf the uncured non-image part is removed by washing with water or a solvent ... " (page 11, lines 16-18)

Absent the photochemical converting substance (carbon black), the invention of the '049 patent is inoperable. Applicants respectfully submit that the carbon black is required, as is not "merely exemplary of the process" as claimed in the Office Action. Therefore under the definition of a "two-component" composition, as used in the Office Action, the '049 patent would require at least a three-component system. Therefore, there is no suggestion or motivation in the '049 Patent to modify the '049 patent to obtain the invention of the instant application.

To establish a *prima facie* case of obviousness, there must be a reasonable expectation of success. There is no reasonable expectation of success based on the teachings in the '049 patent that a two component composition could be prepared because the '049 patent is silent on a two component composition. There cannot be a reasonable expectation of success in obtaining the Applicants' invention when the cited prior art does not provide any teachings regarding a required element in a composition and does not provide any teaching that the recited effects would result from application

of the composition. The Office Action is silent on the reasonable expectation of success in obtaining the Applicant's invention from the '049 patent. Therefore there is no reasonable expectation of success in producing the applicants' invention based on the teachings in the cited prior art.

To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The '049 patent does not teach or suggest the use of a two-component composition as required by the claims. As shown above, the term "two-component" composition is a term of art which is distinct from having two components that exist separately before being mixed, and the '049 patent does not teach a two-component system as used in the art. In addition, as shown above, the position taken by the Office Action with regard to having two components that exist separately before being mixed does not apply because under that definition the '049 patent requires at least a three component system, as shown above. Therefore the '049 patent does not teach or suggest all the claim limitations.

Applicants respectfully submit that the claims are not obvious over JP 62-164049 and the rejection should be withdrawn.

2. Claims 10, 11, 14-22 and 25-30 and 33-36 have been rejected under 35 U.S.C. §103(a) as unpatentable over Flosbach et al. (U.S. 6,013,326).

Flosbach describes coating compositions comprising hydroxy-functional methacrylate copolymers and free or blocked isocyanates. Flosbach teaches the isocyanates can be blocked using imidazoles. Flosbach teaches:

> The coating compositions according to the invention contain one or more free or blocked polyisocyanates as component D). If blocked polyisocyanates are present, the coating compositions according to the invention are one-component (one-pack) coating compositions. If free polyisocyanates are present, they are formulated as two-component (two-pack) systems. (col. 4, lines 26-30) (Emphasis added)

Flosbach teaches that one-component (one-pack) and two-component (two-pack) systems are terms of art. Applicants have discussed above how two component systems are distinct. The Office Action alleges that

> "The '326 process has both the polyol and the blocked isocyanate, and therefore is a two-component system." (page 5, lines 2-3)

Such a teaching is contrary to the teachings of Flosbach. If the mere presence of both the polyol and the blocked isocyanate, as alleged by the Office Action, was all that is required to have a two component system, Flosbach could not distinguish between the one- and two-component systems, since the one-component systems of Flosbach are two-component systems under the definition alleged by the Office Action.

To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. There is no suggestion or motivation in Flosbach to modify or combine the reference teachings to obtain a two-component composition with blocked isocyanates. In fact Flosbach teaches away from such a composition by the teaching recited above, which states that blocked polyisocyanates are used in one component coating compositions while when free polyisocyanates are used, they are formulated as two-component systems. This teaches away from the use of blocked polyisocyanates

in a two-component system, as required in the current application. There cannot be a suggestion or motivation to use a required element when the reference specifically teaches away from a claimed element. Therefore, there is no suggestion or motivation in the Flosbach to modify the reference to obtain the invention of the instant application.

To establish a *prima facie* case of obviousness, there must be a reasonable expectation of success. Flosbach teaches away from such a composition by the teaching recited above, which states that blocked polyisocyanates are used in one component coating compositions, while unblocked polyisocyanates are used in two component coating compositions. This teaches away from the use of blocked polyisocyanates in a two-component system. There cannot be a reasonable expectation of success in obtaining the Applicants' invention when the cited prior art specifically teaches against using a two component composition, as recited above. Therefore there is no reasonable expectation of success in producing the applicants' invention based on the teachings in the cited prior art.

To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Flosbach does not teach or suggest a two component system when blocked isocyanates are used. As shown above, a two component system is a term of art which means more than the mere presence of a polyol and a blocked isocyanate. Therefore, the prior art references, either alone or combined do not teach or suggest all the claim limitations.

Applicants respectfully submit that the claims are not obvious over Flosbach and request that the rejection be withdrawn.

3. Claims 10, 11, 14-22, 25-30 and 33-36 have been rejected under 35 U.S.C. §103(a) as unpatentable over Nasar et al., Polymer International, 48, pp 614-620, 1999.

Nasar teaches the synthesis of imidazole-blocked diisocyanates and the characterization of the blocked diisocyanates. In conducting test to characterize the blocked diisocyanates, the isocyanates were added to various polyols, thereby forming a one-component system. Nasar teaches the use of the compositions (blocked isocyanates) in powder coatings and heat-setting adhesives. Nasar does not teach or suggest forming a two-component composition as required by the claims of the current application. The Office Action states that Nasar teaches reacting HMDI with 2-methylimidazole or benzimidazole to block the isocyanate group, followed by reaction with a polyol. (pages 615 and 620) Applicants respectfully submit that Nasar does not teach reacting the blocked isocyanate with a polyol, but teaches determining the solubility of the blocked isocyanate in various polyols. (See Abstract, page 616, left column second paragraph - Solubility test, and page 619, right column, last sentence to page 620, left column). In addition, Nasar does not teach a two component composition as required by the claims of the current application. The meaning of a two component composition in the art has been discussed above.

To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Nasar does not teach or suggest the two component composition

as required by the claims of the current application. Nasar merely teaches the synthesis and properties of certain imidazole-blocked diisocyanates. Therefore, there is no suggestion or motivation, either in the cited references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings to obtain the invention of the instant application.

To establish a *prima facie* case of obviousness, there must be a reasonable expectation of success. There is no reasonable expectation of success based on the teachings in Nasar that a two component composition could be prepared because Nasar is silent on two component compositions. While Nasar teaches the use of the compositions (blocked isocyanates) in powder coatings and heat-setting adhesives, such uses are distinct from two-component compositions, as required by the claims of the current invention. The Office Action is silent on the reasonable expectation of success in obtaining the Applicants invention from the teaching in Nasar. Therefore there is no reasonable expectation of success in producing the applicants' invention based on the teachings in the cited prior art.

To establish a *prima facie* case of obviousness, the prior art reference must teach or suggest all the claim limitations. Nasar does not teach or suggest a two-component polyurethane as required by the claims. Therefore, the prior art reference does not teach or suggest all the claim limitations.

Applicants respectfully submit that the claims are not obvious over Nasar and therefore request that the rejection be withdrawn.

In view of the foregoing, it is believed that all record rejections are untenable and should be withdrawn. Further, favorable action in the form of a Notice of Allowance is believed to be next in order and is respectfully solicited.

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

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Attachment A. Polyurethane Handbook, Chapter 10 - PU Paints and Coatings; Section 10.1 - Paints and Coatings



# Polyurethane Handbook

Chemistry – Raw Materials – Processing – Application – Properties

Edited by Dr. Günter Oertel

With 544 Figures and 121 Tables

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# 10 PU Paints and Coatings

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## 10.1 Paints and Coatings

Dr. G. Mennicken, W. Wieczorrek

Polyurethane products find a special place among the many binders available for paint and coating formulations. The film formation and curing on the substrate of many of these products occurs through specific chemical reactions. Therefore, polyurethane coatings can generally be classified as reactive coatings.

The investigation of polyisocyanates for paint and coating formulations was a natural extension of polyurethane chemistry due to the various reactions of the isocyanate group as well as its high reactivity (energy content). In the coating area, the term "polyisocyanate" is used to describe adducts containing more than two NCO groups per molecule, which are usually prepared from lower molecular weight diisocyanates (see subsection 3.3.2).

An important step was achieved in 1955 with the introduction of a TDI-trimethylolpropane adduct as an isocyanate component. A decisive breakthrough in the development of high performance PU coatings was attained with the development of an aliphatic (and therefore light stable) polyisocyanate based on hexamethylene diisocyanate (HDI). The first resin of this kind was introduced to the market in 1961. Due to the abundance of products and product types which were developed and are included under the heading of "polyurethane paints" today, a systematic classification of the major product groups is appropriate.

I. Two-component systems in which the binder is comprised of a polyol and a polyisocyanate.
II. One-component systems in which the binder is a polyisocyanate that dries and hardens by reaction with atmospheric moisture (moisture curing).
III. One-component systems in which the binder contains a polyol and a blocked polyisocyanate. The film forming reaction occurs by the reaction of a polyol with the polyisocyanate which has been generated by heating and subsequent "splitting-off" of the blocking agent.

Available as well are completely reacted polyurethane resins which undergo only a physical drying (evaporation of solvent) to form elastomeric coatings.

Also included in this area are the polyurethane modified alkyd and drying oil resins which cure by the principle of oxidative crosslinking, as well as aqueous polyurethane dispersions which are currently under intensive development [1].

The outstanding feature of the type I and II resins is that the curing occurs at *room temperature*. The resulting coatings exhibit a combination of properties that often cannot be achieved with baked finishes. This is of economic importance today and will become even more so in the future as the cost for the energy necessary to bake coatings increases. Detailed descriptions of PU coatings can be found in the literature [2 to 4].